

Solve for x

- $x^2 - x = 6$
- $\frac{x-3}{x+4} = 0$
- $4 = x^{\frac{1}{3}}$
- $e^x = 1$
- $x^2 - 2x - 8 < 0$
- $3x^3 - 12x^2 > 0$

Without using a calculator, sketch each of the following:

- $y + 2x = 3$
- $y = \sqrt{x}$
- $y = e^x$
- $y = \frac{1}{x}$

Evaluate:

- $\cos \frac{\pi}{2}$
- $3x^{-2}$ as $x \rightarrow \infty$
- $f\left(\frac{1}{2}\right)$ if $f(x) = 4x^2 + 2x$
- $\arctan 1$

Simplify

- $\ln e^{4x}$
- $\sin(\arcsin \alpha)$
- $e^{\ln \tan \theta}$

True or False

- $\frac{x}{2} = \frac{1}{2}x$
- $(a+b)^2 = a^2 + b^2$
- $\frac{x}{\frac{1}{2}} = 2x$
- $\tan 3x = 3 \tan x$
- $3^{-x} = -3^x$
- $\sqrt{a^2 + b^2} = a + b$
- $b \ln a = \ln a^b$
- $f^{-1}(x) = \frac{1}{f(x)}$
- $(\cos x)^2 = \cos^2 x^2$
- $e^{\frac{1}{2}} = \sqrt{e}$
- $\frac{x+2(x+1)}{(x+1)^2} = \frac{x+2}{x+1}$

When appropriate, write each answer without radicals and express any fraction without a denominator. Simplify all answers

- $\frac{ax+b}{x}$
- $\frac{(x^2+1)^2}{x}$
- $\sqrt{x}\left(x+\frac{1}{x}\right)$
- $\frac{z-1}{\sqrt{z}}$
- $(w^2 - \sqrt{w})(w^2 + \sqrt{w})$
- $\sqrt{2^{4x} \cdot 5^{4x}}$
- $\frac{\sqrt{t}(t^2+t^3)}{t}$
- $\frac{x}{x^2+1}$

MAT 151

Assessment of Readiness – Part 1: **Answers**

1. 3 and -2
2. 3
3. 64
4. 0
5. $-2 < x < 4$ or $(-2, 4)$
6. $x > 4$
- 7 – 10 graphs
11. 0
12. 0
13. 2
14. $\frac{\pi}{4}$
15. $4x$
16. α
17. $\tan \theta$
18. T
19. F
20. T
21. F
22. F
23. F
24. T
25. F
26. F
27. T
28. F
29. $a + bx^{-1}$
30. $x^3 + 2x + x^{-1}$
31. $x^{\frac{3}{2}} + x^{-\frac{1}{2}}$
32. $z^{\frac{1}{2}} - z^{-\frac{1}{2}}$
33. $w^4 - w$
34. 100^x
35. $t^{\frac{3}{2}} + t^{\frac{5}{2}}$
36. $\frac{x}{x^2 + 1}$ or $x(x^2 + 1)^{-1}$

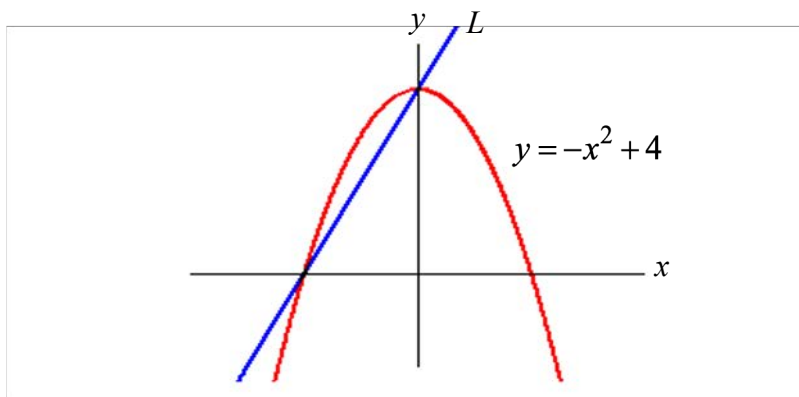
1. If $f(x) = x^3 + 5$, find the average rate of change of $f(x)$ with respect to x from $x = 1$ to $x = 3$.
2. Solve for x : $e^{3x} = 27$
3. If $f(x) = \sqrt{x} - 3$, find $f^{-1}(x)$.
4. If $C(t)$ represents the number of cars, in millions, sold t years after 1980,
 - a. what does $C(15)$ tell us?
 - b. what does $C^{-1}(15)$ tell us?
5. If $f(x) = x^2$, express $\frac{f(x+h) - f(x)}{h}$ in simplest form.
6. Write an equation of the line which passes through the points $(-4, 6)$ and $(3, -8)$.
7. If $h(x) = \frac{3x}{x^2 - 4}$, find:
 - a. the equations of all horizontal asymptotes to the graph of $h(x)$.
 - b. the equations of all vertical asymptotes to the graph of $h(x)$.
8. Find the exact value of: $\tan \frac{\pi}{4} - \sin \frac{3\pi}{2}$
9. Find the exact value of: $\sin(\arctan 1)$
10. If $f(x) = 5x^2 - 3$ and $g(x) = 4x$
 - a. Find the value of $g(f(1))$
 - b. Find an expression for $f(g(x))$.
11. When a new product is advertised, more and more people try it. However, the rate at which new people try it slows as time goes on.
 - a. Sketch a graph of the total number of people who have tried such a product against time.
 - b. What do you know about the concavity of the graph?
12. What is the *exact* range for the function $f(x) = e^{\cos(x)-1}$

13. If $8y = 3e^x$ then x equal to

- a. $x = \ln 8 + \ln 3 + \ln y$
- b. $x = \ln 3 - \ln 8 + \ln y$
- c. $x = \ln 8 + \ln y - \ln 3$
- d. $x = \ln 3 - \ln 8 - \ln y$
- e. none of these

14. What is the domain of $y = \frac{2}{x^2 - 4x}$?

15. Find an equation for line L , shown in the figure below.



16. The table to the right contains values for three different functions.

- a. Which (if any) of these functions are linear functions? For those functions which are linear, find the formula.
- b. Which (if any) of these functions are exponential functions? For those functions which are exponential, find the formula.

x	$f(x)$	$g(x)$	$h(x)$
-2	12	16	37
-1	17	24	34
0	20	36	31
1	21	54	28
2	18	81	25

17. Draw the graph of the function $f(x)$ satisfying the following conditions.

- As $x \rightarrow \infty$, $f(x) \rightarrow 0$.
- As $x \rightarrow -\infty$, $f(x) \rightarrow +\infty$.
- The roots of $f(x)$ are -3 , 1 , and 2 .

ANSWERS

1. 13

2. $\ln 3$

3. $f^{-1} = (x+3)^2$ or $x^2 + 6x + 9$

4. a. number of cars sold in 1995

b. the year when 15 million cars were sold

5. $2x + h$

6. $y = -2x - 2$ (a possible answer)

7. a. $y = 0$

b. $x = 2$ and $x = -2$

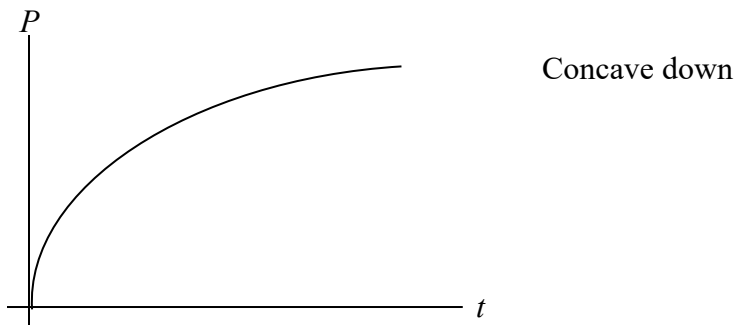
8. 2

9. $\frac{\sqrt{2}}{2}$

10. a. 8

b. $80x^2 - 3$

11.



12. $\frac{1}{e^2} \leq y \leq 1$

13. c

14. $\sim, x \neq 0, 4$

15. $y = 2x + 4$

16. a. $h(x) = 31 - 3x$

b. $g(x) = 36(1.5)^x$

17. A possible graph is shown below. There are more possibilities.

